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EXAMINER	
ZHENG, LI	

ART UNIT	PAPER NUMBER
1638	

NOTIFICATION DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/562,227	MASUTA ET AL.	
	Examiner	Art Unit	
	LI ZHENG	1638	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05 June 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-7* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-7* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *23 December 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *3/23/2006*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-7 are pending and examined on the merits.

Specification

2. The use of the trademarks "Bacto™" , "Seakem™" , "Taq™" and "Long Ranger™" has been noted in this application (for example, pages 14, 15, 17, 18, 22 and 24). They should be capitalized wherever they appear and be accompanied by the generic terminology.

Although the use of trademarks is permissible in patent applications, the proprietary nature of the marks should be respected and every effort made to prevent their use in any manner which might adversely affect their validity as trademarks.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 4 and 6-7 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 4 recites "StuI-stop-MluI-SnaBI". It is unclear what the recitation encompasses. Further, should the recitation refer to a nucleotide sequence, a SEQ ID NO: needs to be indicated. The metes and bounds are unclear.

Written Description

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claims 1-7 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

The claims are drawn to a plant virus vector characterized in that a part of the sequence of the 2b region of the RNA2 molecule of the CMV is deleted and a foreign gene introduction site is inserted into the part of the sequence.

The Office interprets that the claims broadly encompass any virus vector without 2b region of the RNA2 molecule of the CMV and with a foreign gene introduction site.

Therefore, the claim is not limited to a CMV vector due to that only a negative limitation is recited.

The specification teaches preparation of CMV-Y 2b protein C-end deletion virus (pages 24-25 and Figure 1) and CMV-Y not expressing CMV 2b protein by introducing a point mutation at the 8th base of the 2b ORF from U to A (pages 25-27). The specification further teach induction of GFP into CMV-Y RNA2 and expression of GFP in tobacco plant using resultant viral vector (the paragraph bridging pages 27-28; also Figure 4).

First, as discussed above, the claims encompass any virus vector without 2b region of the RNA2 molecule of the CMV and with a foreign gene introduction site inserted due to the negative limitations in the claim language. The specification clearly does not describe any plant viral vector except for CMV-Y viral vectors. Such rejection based on the broad interpretation would be obviated, should a limitation explicitly reciting that the claimed viral vectors is a modified CMV viral vector be added into the claims.

In addition, the specification also does not describe any RNA2 from any CMV isolates except for the RNA 2 from CMV-Y isolate. The specification also fails to describe the region from the StuI site to the stop codon of the 2b ORF or the StuI-AvrII region of pCY2 from any other CMV-isolates. The specification does not correlate the structure of the region from the StuI site to the stop codon of the 2b ORF or the StuI-AvrII region of pCY2 from any other CMV-isolates to the function.

The Federal Circuit has recently clarified the application of the written description requirement to inventions in the field of biotechnology. See University of California v. Eli Lilly and Co., 119 F.3d 1559, 1568, 43 USPQ2d 1398, 1406 (Fed. Cir. 1997). In summary, the court stated that a written description of an invention requires a precise definition, one that defines the structural features of the chemical genus that distinguishes it from other chemical structures. A definition by function does not suffice to define the genus because it is only an indication of what the gene does, rather than what it is. The court goes on to say, "A description of a genus of cDNAs may be achieved by means of a recitation of a representative number of cDNAs, defined by nucleotide sequence, falling within the scope of the genus or of a recitation of structural features common to members of the genus, which features constitute a substantial portion of the genus." *See University of California v. Eli Lilly and Co.*, 119 F.3d 1559; 43 USPQ2d 1398, 1406 (Fed. Cir. 1997).

Applicants fail to describe a representative number of RNA2, the region from the StuI site to the stop codon of the 2b ORF or the StuI-AvrII region of pCY2 from various CMV-isolates. Applicants only describe those regions from CMV-Y isolate. Furthermore, Applicants fail to describe structural features common to members of the claimed genus of polynucleotides. Hence, Applicants fail to meet either prong of the two-prong test set forth by *Eli Lilly*. Furthermore, given the lack of description of the conserved structures for those regions, it remains unclear what features identify the region from the StuI site to the stop codon of the 2b ORF or the StuI-AvrII region of pCY2 from various CMV-isolates. Since said genus has not been described by specific

structural features, the specification fails to provide an adequate written description to support the breath of the claims.

Enablement

5. Claims 1-7 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

The claimed invention is not supported by an enabling disclosure taking into account the *Wands* factors. *In re Wands,* 858/F.2d 731, 8 USPQ2d 1400 (Fed. Cir. 1988). *In re Wands* lists a number of factors for determining whether or not undue experimentation would be required by one skilled in the art to make and/or use the invention. These factors are: the quantity of experimentation necessary, the amount of direction or guidance presented, the presence or absence of working examples of the invention, the nature of the invention, the state of the prior art, the relative skill of those in the art, the predictability or unpredictability of the art, and the breadth of the claim.

The claims are drawn to a plant virus vector characterized in that a part of the sequence of the 2b region of the RNA2 molecule of the CMV is deleted and a foreign gene introduction site is inserted into the part of the sequence.

The Office interprets that the claims broadly encompass any virus vector without 2b region of the RNA2 molecule of the CMV and with a foreign gene introduction site.

The specification teaches preparation of CMV-Y 2b protein C-end deletion virus (pages 24-25 and Figure 1) and CMV-Y not expressing CMV 2b protein by introducing a point mutation at the 8th base of the 2b ORF from U to A (pages 25-27). The specification further teach induction of GFP into CMV-Y RNA2 and expression of GFP in tobacco plant using resultant viral vector (the paragraph bridging pages 27-28; also Figure 4).

First, as discussed above, the claims encompass any virus vector without 2b region of the RNA2 molecule of the CMV and with a foreign gene introduction site due to the negative limitations in the claim language. The specification clearly does not provide guidance on any plant viral vector except for CMV-Y viral vectors. Such rejection based on the broad interpretation would be obviated, should a limitation reciting that the claimed viral vectors is a modified CMV viral vector be added into the claims.

In addition, the specification also does not provide guidance on any RNA2 from any CMV isolates except for the RNA 2 from CMV-Y isolate. The specification also fails to provide guidance on the region from the StuI site to the stop codon of the 2b ORF or the StuI-AvrII region of pCY2 from any other CMV-isolates. The specification does not provide guidance on the conserved structure of the region from the StuI site to the stop codon of the 2b ORF or the StuI-AvrII region of pCY2 from any other CMV-isolates.

Chen et al. (2007, Virus Genes 35:405-413) teach that the nucleotide sequence identity between CMV subgroup II and I strain are only 69 to 77% (the paragraph bridging pages 405-406).

Without further guidance, undue experimentation would be required for a person skilled in the art to sequence CMV isolates and to identify the region from the StuI site to the stop codon of the 2b ORF or the StuI-AvrII region of pCY2 from any other CMV-isolates . See *Genentech Inc. v. Novo Nordisk,* A/S (CA FC) 42 USPQ2d 1001 (Fed. Cir. 1997), which teaches that "the specification, not the knowledge of one skilled in the art" must supply the enabling aspects of the invention.

Therefore, given the claim breadth, lack of further guidance and additional working example, unpredictability of the art, undue experimentation would be required for a person skilled in the art to practice the invention.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by Ding et al. (1996, PNAS, 93:7470-7474).

The claim is drawn to a plant viral vector characterized in that a part of the sequence of the 2b region of the RNA2 molecule of the CMV is deleted and a foreign gene introduction site is inserted into the part of the sequence.

The Office interprets that the claims broadly encompass any virus vector without a part of 2b region of the RNA2 molecule of the CMV and with any foreign gene introduction site inserted.

Ding et al. teach a modified CMV virus in which ORF 2b coding sequence is replaced with a 2b coding sequence from TAV (page 7471, 3rd paragraph of left column; also Figure 1b).

Given that the 2b coding sequence from TAV is broadly considered as a foreign gene introduction site, the reference teaches all the limitations set forth by the claim.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 1-2, 4 and 6-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ding et al. (1996, PNAS, 93:7470-7474) in view of Soards et al. (2002, MPMI 15:647-653).

The claim is drawn to a plant viral vector characterized in that a part of the sequence of the 2b region of the RNA2 molecule of the CMV is deleted and a foreign gene introduction site is inserted into the part of the sequence; or wherein the region from StuI site to stop codon of the 2b ORF of pCY2 is deleted; or wherein StuI-stop-MluI-SnaBI is introduced into the StuI-AvrII region of pCY2; or wherein the foreign gene is inserted into the StuI and MluI region

Ding et al. teach a modified CMV virus in which ORF 2b coding sequence is replaced with a 2b coding sequence from TAV (page 7471, 3rd paragraph of left column; also Figure 1b). The 2b coding sequence from TAV is considered as a foreign gene as well as the foreign gene introduction site.

Ding et al. do not teach the region from StuI site to stop codon of the 2b ORF of pCY2 is deleted. Ding et al. do not teach StuI-stop-MluI-SnaBI is introduced into the StuI-AvrII region of pCY2. Ding et al also do not teach CMV-Y isolate. Ding et al. do not teach that the foreign gene is inserted into the StuI and MluI region.

However, those limitations not taught by the reference are merely considered as obvious design choices given the teaching of Soards et al. that the 2b deletion mutant that encodes a truncated 2a protein can accumulate to the similar level of virus as the CMV possessing the wild-type RNA2 sequence (page 649, 3rd paragraph of right column).

Thus the claimed invention would have been *prima facie* obvious as a whole to one of ordinary skill in the art at the time it was made, especially in the absence of evidence to the contrary.

8. Claims 1-2, 4-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ding et al. (1996, PNAS, 93:7470-7474) in view of Soards et al. (2002, MPMI 15:647-653) as for claims 1-2, 4 and 6-7, further in view of Roossinck et al. (1999, J. of Virology 73:6752-6758).

Claims 1-2,4 and 6-7 are discussed as above. The claim 5 further recites a limitation that CMV is a CMV isolate belonging to subgroup I and subgroup 2 represented by CMV-Y.

Ding et al. in view of Soards et al. do not teach a CMV isolate belonging to subgroup I and subgroup 2 represented by CMV-Y. However, the 2b deletion mutant of Soards et al. is from CMV-Fny (page 648, Table 1).

Roossinck et al. teach that CMV-Y and CMV-Fny are closely related and both belong to subgroup 1A (page 6755, Figure 2).

However, such limitation not taught by the reference is merely considered as obvious design choices given the teaching of Roossinck et al. that CMV-Y and CMV-Fny are closely related and both belong to subgroup 1A.

Thus the claimed invention would have been *prima facie* obvious as a whole to one of ordinary skill in the art at the time it was made, especially in the absence of evidence to the contrary.

9. Claims 1-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ding et al. (1996, PNAS, 93:7470-7474) in view of Soards et al. (2002, MPMI 15:647-653)

and Roossinck et al. (1999, J. of Virology 73:6752-6758) as for claims 1-2 and 4-7, further in view of Ding et al. (1995, EMBO 5762-5772).

Claims 1-2 and 4-7 are discussed as above. The claim 3 further recites a limitation that a point mutation which changes the 8th U of the 2b ORF to A is introduced.

Ding et al. (1996, PNAS, 93:7470-7474) in view of Soards et al. and Roossinck et al. do not teach that a point mutation which changes the 8th U of the 2b ORF to A is introduced.

Ding et al. (1995, EMBO 5762-5772) teach a T to A point mutation is introduced to truncate ORF 2b without changing amino acid sequence encoded by ORF 2a (page 5763, 4th paragraph of right column).

Therefore, the limitation not taught by the references is merely considered as obvious design choices given the teaching of Ding et al. that a point mutation can be introduced to truncate ORF 2b without changing amino acid sequence encoded by ORF 2a.

Thus the claimed invention would have been *prima facie* obvious as a whole to one of ordinary skill in the art at the time it was made, especially in the absence of evidence to the contrary.

Conclusion

No claim is allowed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Li Zheng whose telephone number is 571-272-8031. The examiner can normally be reached on Monday through Friday 9:00 AM - 5:30 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Anne Marie Grunberg can be reached on 571-272-0975. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Anne Marie Grunberg/

Supervisory Patent Examiner, Art Unit 1638